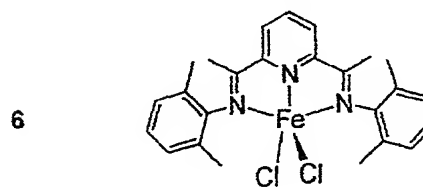
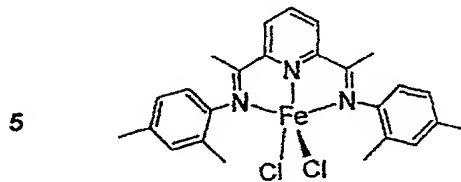
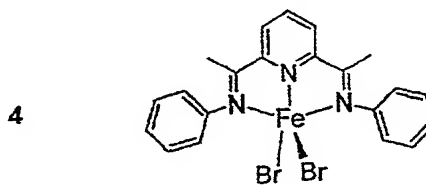
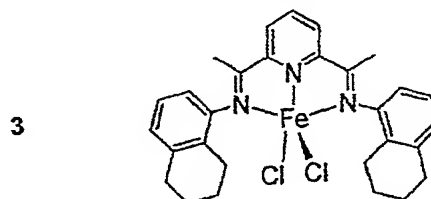
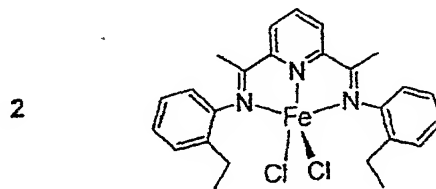
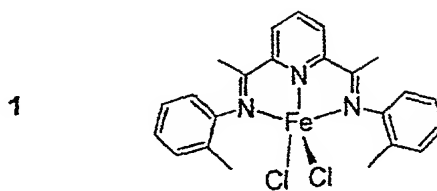


We claim:

- 1 1. A linear alpha-olefin dimer made by a process comprising coupling of an initial olefin and
2 a second olefin.
- 1 2. The dimer of claim 1 made by said process wherein said coupling is head to head coupling
2 accomplished by 1, 2 insertion in the initial olefin followed by 2,1 insertion in the second
3 olefin resulting in a complex which beta-eliminates to produce said linear dimer.
- 1 3. The dimer of claim 2 made by said process wherein said coupling further results in
2 byproducts comprising methyl-branched olefin dimers.
- 1 4. The dimer of claim 3 made by said process wherein said byproducts of said process further
2 comprise olefin trimers.
- 1 5. The dimer of claim 2 made by said process wherein said byproducts of said process
2 comprise less than about five percent vinylidene or tri-substituted olefins.
- 1 6. The dimer of claim 2 made by said process wherein said coupling further results in
2 byproducts comprising vinylidene.
- 1 7. The dimer of claim 1 made by said process wherein said initial olefin is butene and said
2 second olefin is butene and said dimer is a 1-butene dimer.
- 1 8. The dimer of claim 1 made by said process wherein said initial olefin and said second olefin
2 are selected from the group consisting of alpha olefins consisting of about five to about eight
3 carbon atoms.

- 1 9. The dimer of claim 1 made by said process wherein said initial olefin and said second olefin
2 are selected from the group consisting of alpha olefins consisting of about nine or more
3 carbon atoms.
- 1 10. The dimer of claim 2 made by said process wherein said coupling is facilitated with an
2 activated transition metal-based catalyst and said complex is an organo-metallic complex.
- 1 11. The dimer of claim 10 made by said process wherein said transition metal-based catalyst is
2 an iron-based catalyst activated with an aluminum-based co-catalyst.
- 1 12. The dimer of claim 10 made by said process wherein said transition metal-based catalyst is
2 a nickel or cobalt-based catalyst.
- 1 13. The dimer of claim 10 made by said process wherein said transition-metal based catalyst is
2 highly active.

14. The dimer of claim 10 made by said process wherein said transition metal-based catalyst is selected from the group consisting of structures 1, 2, 3, 4, 5, and 6:

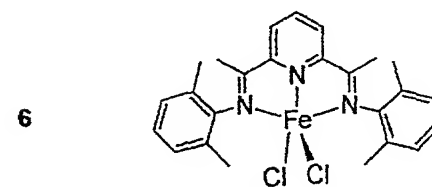
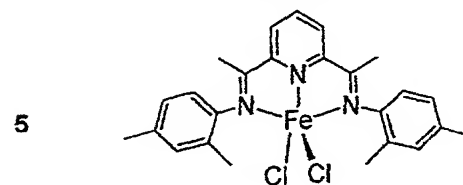
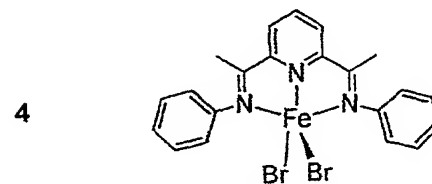
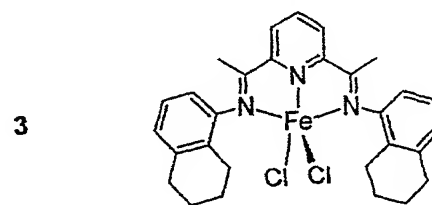
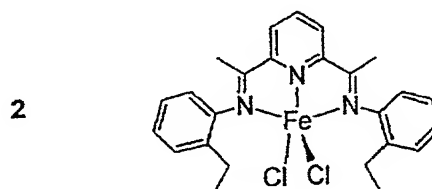
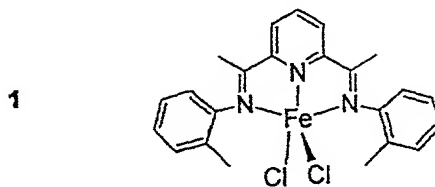


- 1 15. The dimer of claim 14 made by said process wherein said aluminum-based co-catalyst is
2 selected from the group consisting of alumoxane and Lewis acid/trialkylaluminum.
- 1 16. The dimer of claim 2 made by said process wherein said coupling is accomplished at
2 temperatures ranging from about 0 degrees Centigrade to about 80 degrees Centigrade.
- 1 17. The dimer of claim 2 made by said process wherein said coupling is accomplished at
2 temperatures exceeding about 80 degrees Centigrade.
- 1 18. The dimer of claim 2 made by said process wherein said coupling is accomplished in an inert
2 atmosphere.
- 1 19. A feedstock for the production of oxoalcohols comprising the dimer of claim 1.
- 1 20. A method for making alpha-olefin dimers comprising adding olefin feedstock to an activated
2 catalyst and allowing same to react so that a 1, 2 insertion is made in a first olefin and a 2,1
3 insertion is made in a second olefin followed by beta elimination such that head to head
4 coupling of the two olefins occurs.
- 1 21. The method of claim 20 wherein said dimers consist of linear alpha olefin dimers and mono-
2 branched alpha olefin dimers.
- 1 22. The method of claim 20 wherein said dimers consist of linear alpha olefin dimers and a
2 principal byproduct.

- 1 23. A linear 1-butene dimer product of a process comprising head to head coupling of an initial
2 olefin and a second olefin where said coupling is facilitated by an activated iron-based
3 catalyst such that there is a 1, 2 insertion in the initial olefin and a 2, 1 insertion in the second
4 olefin resulting in an organo metallic complex which beta-eliminates to produce said dimer.
- 1 24. The 1-butene dimer of claim 23 made by said process which also produces methyl branched
2 heptene.
- 1 25. The 1-butene dimer of claim 23 of said process where said catalyst is activated by an
2 aluminum-based co-catalyst.

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26. The 1-butene dimer of claim 25 made by said process where said iron-based catalyst is a pre-catalyst selected from the group consisting of structures 1, 2, 3, 4, 5, and 6 and said co-catalyst is an alumoxane or a Lewis acid/trialkylaluminum:



1 27. The 1-butene dimer of claim 23 made by said process where said process is conducted at
2 temperatures ranging from about 0 degrees Centigrade to about 80 degrees Centigrade in an
3 inert atmosphere.

1 28. The 1-butene dimer of claim 23 made by said process wherein butene is recycled in said
2 process for making said 1-butene dimer.

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